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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,728	11/26/2003	Prathyusha K. Salla	139947YOD GEMS:0257	9781
68174	7590	07/01/2009		
GE HEALTHCARE c/o FLETCHER YODER, PC P.O. BOX 692289 HOUSTON, TX 77269-2289			EXAMINER LAMPRECHT, JOEL	
			ART UNIT 3737	PAPER NUMBER
			MAIL DATE 07/01/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/723,728	Applicant(s) SALLA ET AL.	
	Examiner JOEL M. LAMPRECHT	Art Unit 3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7, 9-18, 20, 22-31, 33, 35 and 37-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 9-18, 20, 22-31, 33, 35, 37-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5, 7, 9-18, 20, 22-31, 33, 35, 37-43, 45, 47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hossack (US 6,014,473) in view of Friemel et al (US 5,899,861). Hossack et al discloses the acquisition of motion data along three perpendicular axes (tracking sensors and imager-based, See Col 4 for system overview), including acquisition by two separate motion-sensitive sensor-based methodologies, and one imaging methodology (Col 5 Line 5-Col 6 Line 18), the integration of motion data derived from acquisition image data (Col 9 Line 1-55, Fig 6-11, and Col 7 Line 15-65), and whereby the imaging methods can integrate sets of

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reconstructed and unreconstructed image data in order to form motion datasets for the target region (Col 12 Line 43- Col 13 Line 52).

Hossack et al also discloses the use of sensor-based acquisition data from 2 sensors which can be placed perpendicular to each other (27a-j), along with acquisition image data (along a depth axis in cylindrical coordinates, Col 9 Line 1-10), first as an unreconstructed set of image data (Col 12 Line 40-Col 13 Line 60), used as a relative measurement, and second as a tool for creating a reconstructed set of image data (Col 15 Line 30-Col 16 Line 40). Hossack et al disclose that the sensor based methods and system can include an accelerometer or ultrasonic sensors for measurement of motion (Col 7 line 59-65), the use of the sensor based motion determination system to provide with the imager, three-dimensional motion data for a target region including depth-resolved motion vectors (Col 14 Line 1-35, Col 23 Line 30-Col 24 Line 45), and finally the measurement of annular mechanical motion data (Col 20 Line 30-50).

Hossack et al do not disclose the use of calibration/validation processing for the datasets derived from the imager and sensors, though specific components are normalized, and checks are put into place to determine if the relative motion is "too little" or "too great" for the current data acquisition (Col 23 Line 1-Col 24 Line 5). Attention is then directed to the secondary reference to Leotta et al which discloses the use of calibration/validation data with an ultrasound/motion determination system. The calibration and validation data allows for the sets of data to be efficiently and actively validated during acquisition and during/pre reconstruction (1415-1416). It would have been obvious to one of ordinary skill in the art at the time of the invention to have

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utilized a calibration/validation system of Leotta et al for the purpose of maintaining and determining accuracy as a diagnostic imaging procedure was performed.

Claims 44, 46, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hossack et al in view of Leotta et al as applied to claims 2, 15 and 27 above, and further in view of Friemel et al (US 5,899,861).

Hossack et al in view of Leotta et al disclose all that is listed above, but fail to disclose the use of affixed sensors for acquisition. Attention is directed to the teaching reference to Friemel et al which discloses the use of a stationary ultrasonic transducer array, in combination with data-based, and sensor based techniques to derive in and out of plane motion vectors for a region of interest within a patient (Col 5 Line 20-Col 6 Line 20, Fig 1, Element 110). While the transducer is not explicitly affixed to the body, the stationary holding of an ultrasound which has an integrated accelerometer or bubble sensor to the body provides for the same function as a stationary measurement "affixed" to the body, as relative motion is removed from the example of a rotating gantry. It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the methods/system of Friemel et al with those of Hossack and Leotta et al for the purpose of providing for a redundant method of verifying out-of-plane motion estimations as relates to a sensor/imaging based motion estimation in the body.

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection. Since Hossack et al is still the primary

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reference, Examiner will provide some explanation below and respond to the arguments levied against the previous 102 rejection that would otherwise be repeated. Applicants stress the acquisition of one-dimensional motion data repeatedly during their discussion, however, the integration of 2 separate sensors in 2 dimensions which are perpendicular at least to the imaging sensor plane acquires information for motion derivation in 3-dimensions using 1-dimensional relative measurement vectors. Additionally, Hossack discloses an ultrasound imager, and the motion "tracking" sensors are separate elements and therefore the terms "sensor-based" and "image/data-based" should be clear within the disclosure. The image data (plane) in the Hossack reference passes through the azimuthal axis and thereby forms the "A" axis. Additionally through the use of intermediate frame data, in plane data is normalized and out-of-plane data is aggregated into vectors (Fig 7-10, Col 7 Line 15-45, Col 9 Line 30-55).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL M. LAMPRECHT whose telephone number is (571)272-3250. The examiner can normally be reached on 8:30-5:00 Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRIAN CASLER/
Supervisory Patent Examiner, Art
Unit 3737

JML